

1. Impacts to Navigation from Changes in Surface Water Elevations During Construction and Operations of the Water Conveyance Facilities

Alternative 1A

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Alternative 1A facilities could temporarily and directly affect existing water bodies and drainage facilities, including ditches, canals, pipelines, or pump stations. Operations under Alternative 1A are described in Chapter 3, *Description of Alternatives*.

Construction of the conveyance facilities under Alternative 1A would involve construction of intakes in the water and facilities on the land. Construction activities included in Alternative 1A would require excavation, grading, or stockpiling at project facility sites or at temporary worksites. These activities would result in temporary and long-term changes to drainage patterns, paths and facilities that would, in turn, cause changes in drainage flow rates, directions and velocities.

Site grading needed to construct any of the proposed facilities has the potential to block, reroute, or temporarily detain and impound surface water in existing drainages, which would result in slight increases and decreases in flow rates, velocities, and water surface elevations. Changes in drainage depths would vary depending on the specific conditions at each of the temporary work sites. As drainage paths would be blocked by construction activities, the temporary ponding of drainage water could occur and result in decreases in drainage flow rates downstream of the new facilities, increases in water surface elevations, and decreases in velocities upstream of the new facilities. These temporary changes in drainage would be minimized, and in some cases avoided, by construction of new or modified drainage facilities, as described in the Chapter 3, *Description of Alternatives*. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation.

Removal of groundwater during construction (dewatering) would be required for excavation activities. Groundwater removed during construction would be treated as necessary (see Chapter 3, *Description of Alternatives*, and Chapter 7, *Groundwater*), and discharged to local drainage channels or rivers. This would result in a small localized increase in flows and water surface elevations in the receiving channels. The increase in flows and water surface elevations in the receiving channels and rivers would not affect navigation.

Intakes constructed under Alternative 1A would be on-bank facilities that could encroach into the existing river cross section and would involve construction activities in the Sacramento River, at the northern end of the Delta. Intakes and screens have been designed and located on-bank to minimize changes to river flow characteristics.

Construction of intakes would include the installation of cofferdams at each of the intake locations. Some localized water elevation changes will occur upstream and adjacent to each cofferdam at the intake sites due to facility location within the river. These localized surface elevation changes will not exceed an increase of 0.10 feet at any intake location relative to Existing Conditions and the No Action Alternative, even at high river flows (when surface elevation changes would be expected to be highest). Any decrease in surface water elevations downstream of the cofferdams would be negligible and would not adversely affect navigation. Under existing regulations, USACE, CVFPB, and DWR would require

installation of setback levees or other measures to maintain existing flow capacity in the Sacramento River during construction and operations, which would prevent unacceptable increases in river water surface elevations under flood-flow conditions, reverse flow areas, areas of high velocities that could result in scour, and reflection of flood waves towards other levees.

In total, Alternative 1A would result in alterations to drainage patterns, stream courses, and runoff; and potential for slightly increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway. Construction and operations under Alternative 1A would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 1A creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 1A.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 1B

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Alternative 1B construction would include potential alterations to drainage patterns, stream courses, and runoff, and the potential for slightly increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway, as described in Chapter 3, *Description of Alternatives*. Surface water effects from the facilities under Alternative 1B would be similar to those described for Alternative 1A. Operations under Alternative 1B are described in Chapter 3, *Description of Alternatives*.

In total, Alternative 1B would have potential impacts associated with alterations to drainage patterns, stream courses, and runoff, and the potential for slightly increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway, as described under Alternative 1A. Construction and operations under Alternative 1B would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams

under Alternative 1B creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 1B.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 1C

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Surface water effects from the facilities under Alternative 1C would be similar to those described for Impact under Alternative 1A. Operations under Alternative 1C are described in Chapter 3, *Description of Alternatives*.

Alternative 1C would have potential impacts associated with alterations to drainage patterns, stream courses, and runoff, and the potential for slightly increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway, as described under Alternative 1A. Construction and operations under Alternative 1C would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 1C creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 1C.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 2A

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Effects associated with construction of facilities under Alternative 2A would be identical to those described under Alternative 1A because the facilities would be identical. Operations under Alternative 2A are described in Chapter 3, *Description of Alternatives*.

Alternative 2A would result in alterations to drainage patterns, stream courses, and runoff; and potential for slightly increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway, as described under Alternative 1A. Construction and operations under Alternative 2A would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 2A creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 2A.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 2B

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Effects associated with construction and operations of facilities under Alternative 2B would be identical to those described under Alternative 1B because the facilities would be identical. Operations of the facilities under Alternative 2B would be

identical to actions described under Alternative 2A. Operations under Alternative 2B are described in Chapter 3, *Description of Alternatives*.

Alternative 2B would have potential impacts associated with alterations to drainage patterns, stream courses, and runoff, and the potential for slightly increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway, as described under Alternative 1A. Construction and operations under Alternative 2B would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 2B creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 2B.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 2C

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Effects associated with construction and operations of facilities under Alternative 2C would be identical to those described under Alternative 1C because the facilities would be identical. Operations of the facilities under Alternative 2C would be identical to actions described under Alternative 2A. Operations under Alternative 2C are described in Chapter 3, *Description of Alternatives*.

Alternative 2C would have potential impacts associated with alterations to drainage patterns, stream courses, and runoff; potential for slightly increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway, as described under Alternative 1A. Construction and operations under Alternative 2C would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 2C creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation

would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 2C.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 2D

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Effects associated with construction and operations of facilities under Alternative 2D would be identical to those described under Alternative 2A because the facilities would be identical. Operations of the facilities under Alternative 2D would be similar to actions described under Alternative 2A. Operations under Alternative 2D are described in RDEIR/SDEIR, Section 4, *Alternatives 2D, 4A, and 5A*.

Alternative 2D would have potential impacts associated with alterations to drainage patterns, stream courses, and runoff; potential for increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway, as described under Alternative 1A. Construction and operations under Alternative 2D would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 2D creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 2D.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 3

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Effects associated with construction of facilities under Alternative 3 would be similar to those described under Alternative 1A because the facilities would be identical with the exception of three fewer intakes. However, because Alternative 3 has fewer intakes, the effects under alternative 3 would be less than described under Alternative 1A. Operations under Alternative 3 would be identical to those under Alternative 1A except that there would be more reliance on the south Delta intakes due to the lower capacity provided by two north Delta intakes rather than five. Under Alternative 1A, the north Delta intake capacity is 15,000 cfs, compared to 6,000 cfs under Alternative 3. Operations under Alternative 3 are described in Chapter 3, *Description of Alternatives*.

Alternative 3 would result in alterations to drainage patterns, stream courses, and runoff; and potential for slightly increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway, similar in type but to a lesser extent than described for Alternative 1A. Construction and operations under Alternative 3 would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 3 creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 3.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 4

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Effects associated with construction of facilities under Alternative 4 would be similar to those described under Alternative 1A because similar construction methods and similar features would be used as under Alternative 1A. However, Alternative 4 includes two fewer intakes than alternative 1A so the effects would be less than described under Alternative 1A. Alternative 4 water conveyance operations would be similar to Alternative 2A, with the exception that a range of possible operations for the spring and fall Delta outflow requirements that are considered to be equally likely would be evaluated. Operations under Alternative 4 are described in Chapter 3, *Description of Alternatives*.

Alternative 4 would involve excavation, grading, stockpiling, soil compaction, and dewatering that would result in temporary and long-term changes to drainage patterns, drainage paths, and facilities that would in turn, cause changes in drainage flow rates, directions, and velocities. Construction of cofferdams could result in slight increases in water surface elevations upstream, similar in type but to a lesser extent than described for Alternative 1A. Alternative 4 would result in alterations to drainage patterns, stream courses, and runoff; and potential for slightly increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway. Construction and operations under Alternative 4 would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 4 creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 4.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 4A

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Effects associated with construction and operations of facilities under Alternative 4A would be identical to those described under Alternative 4 because the facilities would be identical. Operations of the facilities under Alternative 4A would be

similar to actions described under Alternative 4. Operations under Alternative 4A are described in RDEIR/SDEIR, Section 4, *Alternatives 2D, 4A, and 5A*.

Intakes constructed under Alternative 4A would be on-bank facilities that could encroach into the existing river cross section and would involve construction activities in the Sacramento River, at the northern end of the Delta. Intakes and screens have been designed and located on-bank to minimize changes to river flow characteristics.

Construction of intakes would include the installation of cofferdams at each of the intake locations. Some localized water elevation changes will occur upstream and adjacent to each cofferdam at the intake sites due to facility location within the river. These localized surface elevation changes will not exceed an increase of 0.10 feet at any intake location relative to Existing Conditions and the No Action Alternative, even at high river flows (when surface elevation changes would be expected to be highest). Any decrease in surface water elevations downstream of the cofferdams would be negligible and would not adversely affect navigation. Under existing regulations, USACE, CVFPB, and DWR would require installation of setback levees or other measures to maintain existing flow capacity in the Sacramento River during construction and operations, which would prevent unacceptable increases in river water surface elevations under flood-flow conditions, reverse flow areas, areas of high velocities that could result in scour, and reflection of flood waves towards other levees.

In total, Alternative 4A would result in alterations to drainage patterns, stream courses, and runoff; and potential for slightly increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway. Construction and operations under Alternative 4A would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 4 creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 4A.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 5

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Facilities construction under Alternative 5 would be similar to those described for Alternative 1A, but with only one intake. Therefore, surface water impacts associated with Alternative 5 would be less than those described for Alternative 1A. Operations under Alternative 5 are described in Chapter 3, *Description of Alternatives*.

In total, Alternative 5 would involve excavation, grading, stockpiling, soil compaction, and dewatering that would result in temporary and long-term changes to drainage patterns, drainage paths, and facilities that would in turn, cause changes in drainage flow rates, directions, and velocities. Construction of cofferdams would cause slight increases in water surface elevations upstream, similar in type but to a lesser extent than described for Alternative 1A. Construction and operations under Alternative 5 would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 5 creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 5.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 5A

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Effects associated with construction and operations of facilities under Alternative 5A would be identical to those described under Alternative 5 because the facilities would be identical. Operations of the facilities under Alternative 5A would be similar to actions described under Alternative 5. Operations under Alternative 5A are described in RDEIR/SDEIR, Section 4, *Alternatives 2D, 4A, and 5A*.

Alternative 5A would involve excavation, grading, stockpiling, soil compaction, and dewatering that would result in temporary and long-term changes to drainage patterns, drainage paths, and facilities that would in turn, cause changes in drainage flow rates, directions, and velocities. Alternative 5A would result in alterations to drainage patterns, stream courses, and runoff; and potential for slightly increased

surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway, similar in type but to a lesser extent than described for Alternative 1A. Construction and operations under Alternative 5A would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 5A creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 5A.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 6A

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Facilities construction under Alternative 6A would be similar to that described for Alternative 1A. Operations under Alternative 6A would be identical to those under Alternative 1A except that there would be more reliance on the north Delta intakes due to the elimination of the south Delta intakes, and Alternative 6A would include operations to comply with Fall X2, as in the No Action Alternative. Operations under Alternative 6A are described in Chapter 3, *Description of Alternatives*.

In total, Alternative 6A would involve excavation, grading, stockpiling, soil compaction, and dewatering that would result in temporary and long-term changes to drainage patterns, drainage paths, and facilities that would in turn, cause changes in drainage flow rates, directions, and velocities. Construction of cofferdams could increase water surface elevations upstream, as explained under Alternative 1A. Construction and operations under Alternative 6A would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 6A creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 6A.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 6B

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Facilities construction under Alternative 6B would be identical to that described for Alternative 1B. Operations of the facilities under Alternative 6B would be identical to actions described under Alternative 6A. Operations under Alternative 6B are described in Chapter 3, *Description of Alternatives*.

In total, Alternative 6B would involve excavation, grading, stockpiling, soil compaction, and dewatering that would result in temporary and long-term changes to drainage patterns, drainage paths, and facilities that would in turn, cause changes in drainage flow rates, directions, and velocities. Construction of cofferdams could slightly increase water surface elevations upstream, as described under alternative 1A. Construction and operations under Alternative 6B would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 6B creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 6B.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered

environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 6C

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Facilities construction under Alternative 6C would be identical to that described for Alternative 1C. Operations of the facilities under Alternative 6C would be identical to actions described under Alternative 6A. Operations under Alternative 6C are described in Chapter 3, *Description of Alternatives*.

In total, Alternative 6C would involve excavation, grading, stockpiling, soil compaction, and dewatering that would result in temporary and long-term changes to drainage patterns, drainage paths, and facilities that would in turn, cause changes in drainage flow rates, directions, and velocities. Construction of cofferdams could cause slight increases in water surface elevations upstream, as described under alternative 1A. Construction and operations under Alternative 6C would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 6C creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 6C.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 7

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Facilities construction under Alternative 7 would be similar to that described for Alternative 1A, but with only three intakes. Therefore, the impacts would be similar in type, but less than those described for Alternative 1A. Operations under Alternative 7 are described in Chapter 3, *Description of Alternatives*.

In total, Alternative 7 would involve excavation, grading, stockpiling, soil compaction, and dewatering that would result in temporary and long-term changes to drainage patterns, drainage paths, and facilities that would in turn, cause changes in drainage flow rates, directions, and velocities. Construction of cofferdams could result in slight increases in water surface elevations upstream, similar in type but to a lesser extent than described for alternative 1A. Construction and operations under Alternative 7 would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 7 creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 7. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 7.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 8

As explained in Chapter 6, *Surface Water*, construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics. Facilities construction under Alternative 8 would be similar to that described for Alternative 1A, but with only three intakes. Therefore, the impacts would be similar in type, but less than those described for Alternative 1A. Operations under Alternative 8 are described in Chapter 3, *Description of Alternatives*.

In total, Alternative 8 would involve excavation, grading, stockpiling, soil compaction, and dewatering that would result in temporary and long-term changes to drainage patterns, drainage paths, and facilities that would in turn, cause changes in drainage flow rates, directions, and velocities. Construction of cofferdams could result in slight increases in water surface elevations upstream, similar in type but to a lesser extent than described for Alternative 1A. Construction and operations under Alternative 8 would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 8 creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4)

the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 8.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

Alternative 9

Facilities constructed under Alternative 9 would include two fish-screened intakes along the Sacramento River near Walnut Grove, numerous operable barriers, two diversion pumping plants and other associated facilities, two culvert siphons, three canal segments, new levees, and new channel connections. Some existing channels would also be enlarged under this alternative. Alternative 9 does not include north Delta intakes. Instead, water continues to flow by gravity from the Sacramento River into two existing channels, Delta Cross Channel and Georgiana Slough. Alternative 9 operates in a manner more similar to the No Action Alternative with operational criteria related to minimizing reverse flows in Old and Middle rivers applying only to Middle River and not including San Joaquin River export/inflow ratio criteria.

As explained in Chapter 6, *Surface Water*, Alternative 9 facilities would temporarily and directly affect existing water bodies and drainage facilities.

Construction of the facilities included in Alternative 9 would require excavation, grading, or stockpiling at project facility sites or at temporary work sites. Site grading needed to construct any of the proposed facilities has the potential to block, reroute, or temporarily detain and impound surface water in existing drainages, which would result in increases and decreases in flow rates, velocities, and water surface elevations. Changes in drainage depths would vary depending on the specific conditions at each of the temporary work sites. As drainage paths would be blocked by construction activities, the temporary ponding of drainage water could occur and result in decreases in drainage flow rates downstream of the new facilities, increases in water surface elevations, and decreases in velocities upstream of the new facilities. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation.

Removal of groundwater during construction (dewatering) would be required for excavation activities. Groundwater removed during construction would be treated as necessary, and discharged to local drainage channels or rivers. This would result in a localized increase in flows and water surface

elevations in the receiving channels. The increase in flows and water surface elevations in the receiving channels would not affect navigation.

Construction of facilities within water bodies would include the installation of cofferdams at each location. Some localized water elevation changes will occur upstream and adjacent to each cofferdam at the intake sites due to facility location within the river. These localized surface elevation changes will not exceed an increase of 0.10 feet at any intake location relative to Existing Conditions and the No Action Alternative even at high river flows (when surface elevation changes would be expected to be highest). Any decrease in surface water elevations downstream of the cofferdams would be negligible and would not adversely affect navigation. Under existing regulations, USACE, CVFPB, and DWR would require installation of setback levees or other measures to maintain existing flow capacity in the waterways during construction and operations, which would prevent unacceptable increases in river water surface elevations under flood-flow conditions.

In total, Alternative 9 would result in alterations to drainage patterns, stream courses, and runoff; and potential for increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway. Construction and operations under Alternative 9 would not result in a substantial decrease in surface water elevations on any navigable waterways and therefore would not have an adverse effect on navigation. Although the increase in surface water elevations in rivers and streams under Alternative 9 creates a potential impact regarding flooding (which is considered less-than-significant with implementation of Mitigation Measure SW-4) the changes in surface water elevation would not have any adverse effects on navigation. See Chapter 6, *Surface Water*, for additional information regarding changes to surface water under Alternative 9.

NEPA Effects: Water depth and surface elevations will not be substantially effected during construction and operation of the water conveyance facilities (either localized or downstream of the intake structures). Although some construction activities and in-water features (i.e., cofferdams) may cause minor changes in surface water elevations, these effects are highly localized and surface water elevations would not increase by more than .10 feet at any location, even during flood events. These changes would not result in a substantial decrease in surface water elevations on any navigable waterways. Therefore, surface water changes associated with construction and operation of the water conveyance facilities would not cause an adverse impact to navigation.

CEQA Conclusion: Because it does not involve a physical change in the environment, effects to navigation caused by changes in surface water elevation, by themselves, are not considered environmental impacts under CEQA. Any secondary physical environmental impacts that may result are covered under other impacts. Nonetheless, as explained above, changes in surface water elevation during construction and operation of the water conveyance facilities will not have a significant impact on navigation.

2. Cumulative navigation impacts related to changes in surface water elevation.

a. Insert in Impact TRANS-12: Cumulative impacts on transportation systems from construction:

Although construction of Alternatives 1A-9 would result in slight changes in surface water elevations, including a slightly increased (less than .10 feet) elevation upstream of cofferdams, any changes in surface water elevation (increase or decrease) under Alternatives 1A-9 would be negligible and would not affect navigation. Surface water changes would be minor (not

exceeding 0.10 feet at any location during flood event) and are highly localized. Furthermore, although it is likely other projects would also have the potential to cause slight changes in surface water elevations, these effects are also highly localized and would not create a cumulatively significant impact when combined with the impacts of Alternatives 1A-9.

b. Insert in Impact TRANS-13: Cumulative impacts on transportation systems from operation and maintenance (post-construction):

Changes in surface water elevation during operation and maintenance of Alternatives 1A-9 would be negligible and would not result in a cumulative significant impact on mitigation. Because effects related to changes in surface water elevation are minimal and highly localized, the changes in surface water elevations from the project in combination with potential changes in surface water elevations from other projects, would not result in a cumulatively significant impact on navigation.